AMENDMENTS TO THE CLAIMS

Claim 1 (withdrawn): A system for neuromuscular function reeducation and restoring physical function of an at least one neuromuscular system associated with an at least one joint in a patient, the system comprising:

at least one sensor for measuring a signal indicative of a force associated with the antagonist resisting muscle system in the neuromuscular system of the patient;

wherein the signal from the antagonist resisting muscle system is used to provide sensory feedback for affecting the joint extension and flexion, through the patient's cognitive action, thereby enabling reeducation and restoration of the physical function of the at least one neuromuscular system.

Claim 2 (withdrawn): The system according to claim 1, wherein the at least one sensor for measuring a signal indicative of a force associated with the antagonist resisting muscle system is a force sensitive resistor (FSR).

Claim 3 (withdrawn): The system according to claim 1, wherein the sensory feedback includes at least one of tactile sensing, audio signal, and light from a source.

Claim 4 (withdrawn): The system according to claim 1, wherein the antagonist resisting muscle system is the flexor muscle system.

Claim 5 (withdrawn): The system according to claim 1, wherein the signal indicative of the force associated with the antagonist resisting muscle system is related to the magnitude of resistance offered by said antagonist resisting muscle system.

Claim 6 (withdrawn): The system according to claim 5, further including a joint position sensor for measuring the joint displacement.

Claim 7 (withdrawn): The system according to claim 6, wherein the magnitude of the resistance is computed by dividing the force obtained from the force sensing system by the displacement as measured by the joint position sensor.

Claim 8 (withdrawn): A system for neuromuscular function reeducation and restoring physical function of an at least one neuromuscular system associated with an at least one joint in a patient, the system comprising:

at least one sensor for measuring an electrical signal associated with an agonist muscle in the neuromuscular system of the patient;

at least one sensor for measuring a force signal associated with an antagonist resisting muscle;

wherein at least one of the electrical signal associated with the agonist muscle and the force signal associated with the antagonist resisting muscle is used to provide sensory feedback for affecting the joint extension and flexion thereby enabling reeducation and restoration of the physical function of the at least one neuromuscular system.

Claim 9 (withdrawn): The system according to claim 8, wherein the sensory feedback is provided through an audio signal.

Claim 10 (withdrawn): The system according to claim 8, wherein the at least one sensor for measuring an electrical signal associated with the agonist muscle is an EMG sensor.

Claim 11 (withdrawn): The system according to claim 8, wherein the antagonist resisting muscle is the flexor muscle.

Claim 12 (withdrawn): A system for neuromuscular function reeducation and restoring physical function of an at least one neuromuscular system associated with an at least one joint in a patient, the system comprising:

at least one sensor for measuring an electrical signal associated with an agonist muscle in the neuromuscular system of the patient;

at least one sensor for measuring a force signal associated with an antagonist resisting muscle;

at least one electrode for providing a neuromuscular stimulation to the at least one neuromuscular system;

wherein at least one of the electrical signal associated with the agonist muscle and the electrical signal associated with the antagonist resisting muscle is used to provide sensory feedback, the sensory feedback and the neuromuscular stimulation affecting the joint extension and flexion thereby enabling reeducation and restoration of the physical function of the at least one neuromuscular system.

Claim 13 (withdrawn): The system according to claim 12, wherein the sensory feedback is provided by at least one LED.

Claim 14 (withdrawn): The system according to claim 12, wherein the at least one sensor for measuring an electrical signal associated with the agonist muscle is an EMG sensor.

Claim 15 (withdrawn): The system according to claim 12, wherein the antagonist resisting muscle is the flexor muscle.

Claim 16 (withdrawn): A system for neuromuscular function reeducation and restoring physical function of an at least one neuromuscular system associated with an at least one joint in a patient, the system comprising:

a continuous passive device for allowing the extension and flexion of the joint, said continuous passive device having a mechanical compliance which allows self-actuation of the joint thereby providing neuromuscular function reeducation and restoration of the physical function of the neuromuscular system.

Claim 17 (withdrawn): The system according to claim 16, wherein the continuous passive device is force activated.

Claim 18 (withdrawn): The system according to claim 16, wherein the mechanical compliance of the continuous passive device is substantially large.

Claim 19 (withdrawn): The system according to claim 16, further comprising at least one force sensor for measuring a parameter indicative of resistance of an antagonist resisting muscle, the antagonist resisting muscle being part of the neuromuscular system.

Claim 20 (withdrawn): The system according to claim 19, wherein the parameter indicative of the resistance of the antagonist resisting muscle is used for affecting the joint extension and flexion thereby enabling reeducation and restoration of the physical function of the at least one neuromuscular system.

Claim 21 (withdrawn): The system according to claim 16, wherein the at least one force sensor is a force sensitive resistor.

Claim 22 (withdrawn): The system according to claim 16, wherein the continuous passive device is an air-muscle device.

Claim 23 (withdrawn): A system for neuromuscular function reeducation and restoring physical function of an at least one neuromuscular system associated with an at least one joint in a patient, the system comprising:

a continuous passive machine including an air-muscle device for allowing the extension and flexion of the joint in the patient;

wherein the continuous passive device enables reeducation and restoration of the physical function of the neuromuscular system in the patient through the at least one of a visual, aural, and tactile feedback of the measured parameters obtained from the patient.

Claim 24 (withdrawn): The system according to claim 23, wherein the air-muscle device is inflatable.

Claim 25 (withdrawn): The system according to claim 24, wherein the air-muscle device shortens in length upon inflation thereby causing the joint to pivot about at least one axis.

Claim 26 (withdrawn): The system according to claim 23, wherein the measured parameters include at least one EMG signal associated with an agonist muscle in the neuromuscular system.

Claim 27 (withdrawn): The system according to claim 23, wherein the measured parameters include at least one parameter indicative of resistance of at least one antagonist resisting muscle in the neuromuscular system.

Claim 28 (withdrawn): The system according to claim 23, wherein the visual feedback is provided through at least one LED.

Claims 29 - 44 (canceled)

Claim 45 (withdrawn): A system for providing movement to at least one joint for restoring physical function of at least one neuromuscular system associated with the joint, the device comprising:

at least one inflatable device adjacent to said at least one joint and each device having two ends, wherein one end is connected to a distal element of the joint and the other end to a proximal element of the joint;

a source for supplying pressurized air to the inflatable device;

wherein the inflatable device shortens in length upon inflation thereby causing said at least one joint to pivot about at least one axis.

Claim 46 (withdrawn): The system according claim 45, wherein the at least one inflatable device is an air-muscle.

Claim 47 (withdrawn): The system according to claim 45, wherein the supply of pressurized air to the inflatable device is controlled by a controller.

Claim 48 (withdrawn): The system according to claim 47, further including at least one force sensor for measuring a parameter indicative of muscle resistance.

Claim 49 (withdrawn): The system according to claim 48, further including at least one joint position sensor for measuring joint movement.

Claim 50 (withdrawn): The system according to claim 49, further including at least one EMG sensor for measuring the electrical activity of said at least one neuromuscular system.

Claim 51 (withdrawn): The system according to claim 50, further including at least one neuromuscular electrical stimulating (NMES) system.

Claim 52 (withdrawn): The system according to claim 51, wherein the controller implements a protocol for affecting the at least one joint motion based on the measurements from the sensors thereby restoring physical function of said neuromuscular system associated with the joint.

Claim 53 (withdrawn): A method implementing a protocol for restoring physical function of at least one neuromuscular system associated with a joint in a patient, the method comprising:

  measuring a first signal indicative of the activity of said muscle through an EMG sensor;

  measuring a second signal indicative of the joint motion through a joint position sensor;

  measuring a third signal indicative of the muscle resistance through a force sensor;

  mapping the measured signals to at least one parameter; and

  controlling the air level in an inflatable device in order to optimize said parameter for restoring physical function of said muscle associated with the joint in the patient, the inflatable device being adjacent to the joint and being inflated or deflated through at least one port associated with the device.

Claim 54 (withdrawn): The method according to claim 53, further including storing information in an electronic memory system, said information including patient compliance and patient performance.

Claim 55 (withdrawn): The method according to claim 54, further providing the stored information from the electronic memory system to the patient on demand.

Claim 56 (withdrawn): The method according to claim 53, wherein the EMG sensor is used for measuring the electrical activity of an agonist resisting neuromuscular system.

Claim 57 (withdrawn): The method according to claim 53, wherein the force sensor is used for measuring the force signal from an antagonist resisting neuromuscular system.

Claim 58 (withdrawn): The method according to claim 53, wherein the force sensor is a force sensitive resistor.

Claim 59 (withdrawn): The method according to claim 54, further including the step of displaying the electrical activity from the EMG sensor to the patient through a first display.

Claim 60 (withdrawn): The method according to claim 59, further including the step of displaying a degree of flexor resistance torque measured by the force sensor through a second display.

Claim 61 (withdrawn): The method according to claim 60, wherein the displays provide a means for the patient to monitor the compliance and performance.

Claim 62 (withdrawn): The method according to claim 61, further including the step of updating the displays to provide a mechanism for the patient to improve said performance and said compliance.

Claim 63 (withdrawn): The method according to claim 53, further providing a stimulation through at least one neuromuscular stimulating electrode to the neuromuscular system.

Claim 64 (withdrawn): A method implementing a protocol for restoring physical function of at least one neuromuscular system associated with a joint in a patient, the method comprising:

measuring a first signal indicative of antagonist muscle resistance through a force sensor in the neuromuscular system of the patient;

wherein the signal from the antagonist resisting muscle is used to provide sensory feedback for affecting the joint extension and flexion, through the patient's cognitive action, thereby enabling reeducation and restoration of the physical function of the at least one neuromuscular system.

Claim 65 (withdrawn): The method according to claim 64, further including measuring a second signal indicative of the joint motion through a joint position sensor.

Claim 66 (withdrawn): The method according to claim 64, further including measuring an electrical signal associated with an agonist muscle in the neuromuscular system of the patient.

Claim 67 (withdrawn): The method according to claim 64, further including providing a stimulation through at least one neuromuscular stimulating electrode to the neuromuscular system.

Claim 68 (withdrawn): The method according to claim 66, further including mapping the measured signals to at least one parameter for optimization.

Claim 69 (previously presented): A system for assisting neuromuscular function comprising:

at least one EMG sensor for detecting self-actuation of a neuromuscular system;

at least one joint position sensor for detecting self-actuation of a joint;

a computer processor for implementing a protocol responsive when self-actuation or attempted self-actuation is detected by the at least one EMG sensor but is not detected by the at least one joint position sensor; and

a motion causing device for assisting the at least one joint in movement, said motion causing device following the protocol implemented by the computer processor.

Claim 70 (previously presented): The system of claim 69 further including at least one force sensor for measuring a parameter indicative of muscle resistance.

Claim 71 (previously presented): The system of claim 70 further including an electronic memory system for storing information regarding the patient.

Claim 72 (previously presented): The system of claim 71 wherein the protocol is based on previous measurements recorded from at least one of the EMG sensor, joint position sensor, and force sensor.

Claim 73 (previously presented): The system of claim 69 further including at least one neuromuscular electrical stimulating (NMES) system for providing neuromuscular stimulation to the at least one neuromuscular system.

Claim 74 (previously presented): The system according to claim 69, wherein the motion causing device is an air-muscle.

Claim 75 (previously presented): The system according to claim 74, wherein the air-muscle includes at least one port for supplying pressurized air to inflate said air-muscle.

Claim 76 (currently amended): The system according to claim 75, wherein the <u>computer processor</u> ~~microprocessor~~ controls at least one valve for controlling the supply of pressurized air to the air-muscle.

Claim 77 (currently amended): The system according to claim <u>70</u>[[69]], further including a first display for depicting the electrical activity from the EMG sensor.

Claim 78 (previously presented): The system according to claim 77, further including a second display indicating a degree of flexor resistance torque measured by the at least one force sensor.

Claim 79 (previously presented): The system according to claim 78, wherein the displays provide a means for the patient to monitor the compliance and performance.

Claim 80 (previously presented): The system according to claim 79, wherein the controller updates the displays in a predetermined manner to provide a mechanism for the patient to improve said performance and said compliance.

Claim 81 (cancelled)

Claim 82 (previously presented): A system for assisting neuromuscular function comprising:

at least one joint position sensor for detecting self-actuation of a joint and measuring a joint motion;

a computer processor for implementing a protocol responsive when self-actuation is detected by the at least one joint position sensor and the measured joint motion has not achieved a predetermined value or when self-actuation is attempted and the measured joint motion has not achieved a predetermined value; and

a motion causing device for assisting the at least one joint in movement, said motion causing device following the protocol implemented by the computer processor such that the joint motion achieves the predetermined value.

Claim 83 (previously presented):   The system according to claim 82, wherein the motion causing device is an air-muscle.

Claim 84 (new):   The system according to claim 69, further including a first display for depicting the electrical activity from the EMG sensor.